

PATENT COOPERATION TREATY

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Commissioner
 US Department of Commerce
 United States Patent and Trademark
 Office, PCT
 2011 South Clark Place Room
 CP2/5C24
 Arlington, VA 22202
 ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

Date of mailing (day/month/year) 07 August 2001 (07.08.01)	Applicant's or agent's file reference OPP990764KR
International application No. PCT/KR00/01461	Priority date (day/month/year) 17 December 1999 (17.12.99)
International filing date (day/month/year) 14 December 2000 (14.12.00)	
Applicant JEONG, Ga-Jin et al	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:

23 May 2001 (23.05.01)

☐ in a notice effecting later election filed with the International Bureau on:

2. The election
- ☒
- was

☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer Zakaria EL KHODARY
Facsimile No.: (41-22) 740.14.35	Telephone No.: (41-22) 338.83.38

PCT REQUEST

OPP990764KR

Original (for SUBMISSION) - printed on 14.12.2000 01:05:42 PM

0	For receiving Office use only	
0-1	International Application No.	
0-2	International Filing Date	
0-3	Name of receiving Office and "PCT International Application"	
0-4	Form - PCT/RO/101 PCT Request	
0-4-1	Prepared using	PCT-EASY Version 2.91 (updated 10.10.2000)
0-5	Petition The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty	
0-6	Receiving Office (specified by the applicant)	Korean Industrial Property Office (RO/KR)
0-7	Applicant's or agent's file reference	OPP990764KR
I	Title of invention	BEAN CURD CONTAINING LACTIC ACID FERMENTING BACTEIRA CULTURE FLUID AND A METHOD FOR PREPARING THE SAME, AND BEVERAGE CONTAINING LACTIC ACID FERMENTING BACTERIA AND A METHOD FOR PREPARING THE SAME
II	Applicant	
II-1	This person is:	applicant only
II-2	Applicant for	all designated States except US
II-4	Name	MICROBIA CORPORATION LIMITED.
II-5	Address:	Owner venture town 710 Bongcheon 7-dong 1661-4, Kwanak-ku 151-057 Seoul Republic of Korea
II-6	State of nationality	KR
II-7	State of residence	KR
II-8	Telephone No.	82-2-880-6707
II-9	Facsimile No.	82-2-887-1450
III-1	Applicant and/or inventor	
III-1-1	This person is:	applicant and inventor
III-1-2	Applicant for	US only
III-1-4	Name (LAST, First)	JEONG, Ga-Jin
III-1-5	Address:	Myungsoodae Hyundai Apt. 109-1404 Heuksuk 2-dong 10, Dongjak-ku 156-856 Seoul Republic of Korea
III-1-6	State of nationality	KR
III-1-7	State of residence	KR

PCT REQUEST

OPP990764KR

Original (for SUBMISSION) - printed on 14.12.2000 01:05:42 PM

III-2	Applicant and/or inventor	
III-2-1	This person is:	applicant and inventor
III-2-2	Applicant for	US only
III-2-4	Name (LAST, First)	KIM, John-N.
III-2-5	Address:	10810 Deep Glen Drive Potomac, MD 20854 United States of America
III-2-6	State of nationality	US
III-2-7	State of residence	US
III-3	Applicant and/or inventor	
III-3-1	This person is:	applicant and inventor
III-3-2	Applicant for	US only
III-3-4	Name (LAST, First)	KIM, Philomena-H.
III-3-5	Address:	10810 Deep Glen Drive Potomac, MD 20854 United States of America
III-3-6	State of nationality	US
III-3-7	State of residence	US
III-4	Applicant and/or inventor	
III-4-1	This person is:	applicant and inventor
III-4-2	Applicant for	US only
III-4-4	Name (LAST, First)	RYU, Jae-Won
III-4-5	Address:	7011 Mccowan Rd#303 Markham, Ontario L3S 3L7 Canada
III-4-6	State of nationality	CA
III-4-7	State of residence	CA
III-5	Applicant and/or inventor	
III-5-1	This person is:	applicant and inventor
III-5-2	Applicant for	US only
III-5-4	Name (LAST, First)	HAN, Hong-Ui
III-5-5	Address:	Sampoong Apt. 25-901 Seocho-dong 1685, Seocho-ku 137-070 Seoul Republic of Korea
III-5-6	State of nationality	KR
III-5-7	State of residence	KR

PCT REQUEST

OPP990764KR


Original (for SUBMISSION) - printed on 14.12.2000 01:05:42 PM

IV-1	Agent or common representative; or address for correspondence The person identified below is hereby/has been appointed to act on behalf of the applicant(s) before the competent International Authorities as:	agent
IV-1-1	Name (LAST, First)	KIM, Won-Ho
IV-1-2	Address:	Teheran Bldg., 825-33, Yoksam-dong, Kangnam-ku 135-080 Seoul Republic of Korea
IV-1-3	Telephone No.	82-2-3458-0700
IV-1-4	Facsimile No.	82-2-553-5254
IV-1-5	e-mail	email@youme.com
V	Designation of States	
V-1	Regional Patent (other kinds of protection or treatment, if any, are specified between parentheses after the designation(s) concerned)	AP: GH GM KE LS MW MZ SD SL SZ TZ UG ZW and any other State which is a Contracting State of the Harare Protocol and of the PCT EA: AM AZ BY KG KZ MD RU TJ TM and any other State which is a Contracting State of the Eurasian Patent Convention and of the PCT EP: AT BE CH&LI CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE TR and any other State which is a Contracting State of the European Patent Convention and of the PCT OA: BF BJ CF CG CI CM GA GN GW ML MR NE SN TD TG and any other State which is a member State of OAPI and a Contracting State of the PCT
V-2	National Patent (other kinds of protection or treatment, if any, are specified between parentheses after the designation(s) concerned)	AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH&LI CN CR CU CZ DE DK DM DZ EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ PL PT RO RU SD SE SG SI SK SL TJ TM TR TT TZ UA UG US UZ VN YU ZA ZW
V-5	Precautionary Designation Statement In addition to the designations made under items V-1, V-2 and V-3, the applicant also makes under Rule 4.9(b) all designations which would be permitted under the PCT except any designation(s) of the State(s) indicated under item V-6 below. The applicant declares that those additional designations are subject to confirmation and that any designation which is not confirmed before the expiration of 15 months from the priority date is to be regarded as withdrawn by the applicant at the expiration of that time limit.	

PCT REQUEST

OPP990764KR

Original (for SUBMISSION) - printed on 14.12.2000 01:05:42 PM

V-6	Exclusion(s) from precautionary designations	NONE	
VI-1	Priority claim of earlier national application		
VI-1-1	Filing date	17 December 1999 (17.12.1999)	
VI-1-2	Number	1999-58572	
VI-1-3	Country	KR	
VII-1	International Searching Authority Chosen	Korean Industrial Property Office (KIPO) (ISA/KR)	
VIII	Check list	number of sheets	electronic file(s) attached
VIII-1	Request	4	-
VIII-2	Description	9	-
VIII-3	Claims	2	-
VIII-4	Abstract	1	abstract.txt
VIII-5	Drawings	1	-
VIII-7	TOTAL	17	
	Accompanying items	paper document(s) attached	electronic file(s) attached
VIII-8	Fee calculation sheet	✓	-
VIII-9	Separate signed power of attorney		-
VIII-12	Priority document(s)	Item(s) VI-1	-
VIII-16	PCT-EASY diskette	-	diskette
VIII-18	Figure of the drawings which should accompany the abstract	1	
VIII-19	Language of filing of the international application	Korean	
IX-1	Signature of applicant or agent		
IX-1-1	Name (LAST, First)	KIM, Won-Ho 	

FOR RECEIVING OFFICE USE ONLY

10-1	Date of actual receipt of the purported international application	
10-2	Drawings:	
10-2-1	Received	
10-2-2	Not received	
10-3	Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application	
10-4	Date of timely receipt of the required corrections under PCT Article 11(2)	
10-5	International Searching Authority	ISA/KR
10-6	Transmittal of search copy delayed until search fee is paid	

FOR INTERNATIONAL BUREAU USE ONLY

11-1	Date of receipt of the record copy by the International Bureau	
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PCT (ANNEX - FEE CALCULATION SHEET)

OPP990764KR

Original (for SUBMISSION) - printed on 14.12.2000 01:05:42 PM

(This sheet is not part of and does not count as a sheet of the international application)

0	For receiving Office use only	
0-1	International Application No.	
0-2	Date stamp of the receiving Office	
0-4	Form - PCT/RO/101 (Annex)	
0-4-1	PCT Fee Calculation Sheet Prepared using	PCT-EASY Version 2.91 (updated 10.10.2000)
0-9	Applicant's or agent's file reference	OPP990764KR
2	Applicant	MICROBIA CORPORATION LIMITED., et al.
12	Calculation of prescribed fees	fee amount/multiplier total amounts (KRW)
12-1	Transmittal fee T	⇒ 45,000
12-2	Search fee S	⇒ 150,000
12-3	International fee	
	Basic fee	
	(first 30 sheets) b1	464,100
12-4	Remaining sheets	0
12-5	Additional amount (X)	10,700
12-6	Total additional amount b2	0
12-7	b1 + b2 = B	464,100
12-8	Designation fees	
	Number of designations contained in international application	86
12-9	Number of designation fees payable (maximum 8)	8
12-10	Amount of designation fee (X)	100,000
12-11	Total designation fees D	800,000
12-12	PCT-EASY fee reduction R	-142,800
12-13	Total International fee (B+D-R) I	⇒ 1,121,300
12-17	TOTAL FEES PAYABLE (T+S+I+P)	⇒ 1,316,300
12-19	Mode of payment	cash

VALIDATION LOG AND REMARKS

13-2-1	Validation messages Request	Green? A translation of the international application into English will have to be prepared under the responsibility of the ISA selected.
		Green? Please note that the entire request (including the title of invention) must be in English
		Green? The title of the invention shall be short and precise. Please verify.

PCT (ANNEX - FEE CALCULATION SHEET)

OPP990764KR

Original (for SUBMISSION) - printed on 14.12.2000 01:05:42 PM

13-2-2	Validation messages States	Green? More designations could be made. The following States have not been designated: KR. Please verify.
13-2-6	Validation messages Contents	Yellow Accompanying item "separate signed power of attorney" has not been indicated as enclosed.
13-2-10	Validation messages For receiving Office/International Bureau use only	Green? Verify electronic data for consistency against printed form.

PCT COOPERATION TREATY

PCT

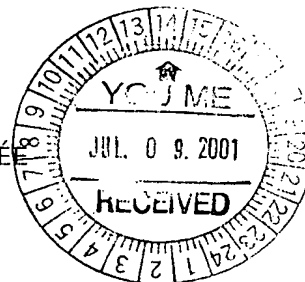
NOTICE INFORMING THE APPLICANT OF THE COMMUNICATION OF THE INTERNATIONAL APPLICATION TO THE DESIGNATED OFFICES

(PCT Rule 47.1(c), first sentence)

From the INTERNATIONAL BUREAU

To:

KIM, Won-Ho
Teheran Building
825-33, Yoksam-dong
Kangnam-ku
Seoul 135-080
RÉPUBLIQUE DE CORÉE



Date of mailing (day/month/year) 21 June 2001 (21.06.01)		
Applicant's or agent's file reference OPP990764KR		IMPORTANT NOTICE
International application No. PCT/KR00/01461	International filing date (day/month/year) 14 December 2000 (14.12.00)	Priority date (day/month/year) 17 December 1999 (17.12.99)
Applicant MICROBIA CORPORATION LIMITED et al		

- Notice is hereby given that the International Bureau has communicated, as provided in Article 20, the international application to the following designated Offices on the date indicated above as the date of mailing of this Notice:
AU, KP, US

In accordance with Rule 47.1(c), third sentence, those Offices will accept the present Notice as conclusive evidence that the communication of the international application has duly taken place on the date of mailing indicated above and no copy of the international application is required to be furnished by the applicant to the designated Office(s).

- The following designated Offices have waived the requirement for such a communication at this time:
AE, AG, AL, AM, AP, AT, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EA, EE, EP, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OA, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU,

The communication will be made to those Offices only upon their request. Furthermore, those Offices do not require the applicant to furnish a copy of the international application (Rule 49.1(a-bis)).

- Enclosed with this Notice is a copy of the international application as published by the International Bureau on 21 June 2001 (21.06.01) under No. WO 01/43565

REMINDER REGARDING CHAPTER II (Article 31(2)(a) and Rule 54.2)

If the applicant wishes to postpone entry into the national phase until 30 months (or later in some Offices) from the priority date, a demand for international preliminary examination must be filed with the competent International Preliminary Examining Authority before the expiration of 19 months from the priority date.

It is the applicant's sole responsibility to monitor the 19-month time limit.

Note that only an applicant who is a national or resident of a PCT Contracting State which is bound by Chapter II has the right to file a demand for international preliminary examination.

REMINDER REGARDING ENTRY INTO THE NATIONAL PHASE (Article 22 or 39(1))

If the applicant wishes to proceed with the international application in the national phase, he must, within 20 months or 30 months, or later in some Offices, perform the acts referred to therein before each designated or elected Office.

For further important information on the time limits and acts to be performed for entering the national phase, see the Annex to Form PCT/IB/301 (Notification of Receipt of Record Copy) and Volume II of the PCT Applicant's Guide.

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No. (41-22) 740.14.35	Authorized officer J. Zahra Telephone No. (41-22) 338.83.38
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PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference OPP990764KR	FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. PCT/KR00/01461	International filing date (<i>day/month/year</i>) 14 DECEMBER 2000 (14.12.2000)	(Earliest) Priority Date (<i>day/month/year</i>) 17 DECEMBER 1999 (17.12.1999)
Applicant MICROBIA CORPORATION LIMITED. et al		

This International search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 3 sheets.

☐ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing:

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

2. ☐ **Certain claims were found unsearchable** (See Box I).

3. ☐ **Unity of invention is lacking** (See Box II).

4. With regard to the **title**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawing** to be published with the abstract is Figure No. 1

☒ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

☐ None of the figures.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/KR00/01461

A. CLASSIFICATION OF SUBJECT MATTER**IPC7 A23L 1/20**

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

NPS

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	KR 1999-0065688 A (HAI TAI CONFECTIONERY CO., LTD.) 05 August 1999 (05.08.99) see page 3, example 2; claim 1	1-2
X	KR 1998-0068758 A (JAE-SHIK SHIM) 26 October 1998 (26.10.98) see 3 and 4, examples 1 and 2; claims 1-3	11-12
X	KR 1983-0009733 A (CHUL-YOUNG JANG) 23 December 1983 (23.12.83) see claim 1	11-12

☐ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

30 MARCH 2001 (30.03.2001)

Date of mailing of the international search report

30 MARCH 2001 (30.03.2001)

Name and mailing address of the ISA/KR

Korean Industrial Property Office
Government Complex-Taejon, Dunsan-dong, So-ku, Taejon
Metropolitan City 302-701, Republic of Korea

Facsimile No. 82-42-472-7140

Authorized officer

LEE, Ho Jo

Telephone No. 82-42-481-5631



INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

P/KR00/01461

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
KR 1999-0065688 A	05.08.99	None	
KR 1998-0068758 A	26.10.98	None	
KR 1983-0009733 A	23.12.83	None	

INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR00/01461

A. CLASSIFICATION OF SUBJECT MATTER IPC7 A23L 1/20 According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) NPS		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	KR 1999-0065688 A (HAI TAI CONFECTIONERY CO., LTD.) 05 August 1999 (05.08.99) see page 3, example 2; claim 1	1-2
X	KR 1998-0068758 A (JAE-SHIK SHIM) 26 October 1998 (26.10.98) see 3 and 4, examples 1 and 2; claims 1-3	11-12
X	KR 1983-0009733 A (CHUL-YOUNG JANG) 23 December 1983 (23.12.83) see claim 1	11-12
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.		
* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "F" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
Date of the actual completion of the international search 30 MARCH 2001 (30.03.2001)		Date of mailing of the international search report 30 MARCH 2001 (30.03.2001)
Name and mailing address of the ISA/KR Korean Industrial Property Office Government Complex-Taejon, Dunsan-dong, So-ku, Taejon Metropolitan City 302-701, Republic of Korea Facsimile No. 82-42-472-7140		Authorized officer LEE, Ho Jo Telephone No. 82-42-481-5631

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/KR00/01461

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
KR 1999-0065688 A	05.08.99	None	
KR 1998-0068758 A	26.10.98	None	
KR 1983-0009733 A	23.12.83	None	

PATENT COOPERATION TREATY
PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT
(PCT Article 36 and Rule 70)

REC'D 01 MAY 2002

PCT

Applicant's or agent's file reference OPP 990764 KR	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/KR00/01461	International filing date (day/month/year) 14 DECEMBER 2000 (14.12.2000)	Priority date (day/month/year) 17 DECEMBER 1999 (17.12.1999)
International Patent Classification (IPC) or national classification and IPC IPC7 A23L 1/20		
Applicant MICROBIA CORPORATION LIMITED. et al		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 16 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☒ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☒ Certain observations on the international application

Date of submission of the demand 23 MAY 2001 (23.05.2001)	Date of completion of this report 11 APRIL 2002 (11.04.2002)
Name and mailing address of the IPEA/KR Korean Intellectual Property Office Government Complex-Daejeon, 920 Dunsan-dong, Seo-gu, Daejeon Metropolitan City 302-701, Republic of Korea Facsimile No. 82-42-472-7140	Authorized officer LEE, Ho Jo Telephone No. 82-42-481-5631



INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/KR00/01461

I. Basis of the report

1. With regard to the elements of the international application:*

- ☐ the international application as originally filed
- ☒ the description:
pages _____, as originally filed
pages _____, filed with the demand
pages 1-13, filed with the letter of 22 February 2002
- ☒ the claims:
pages _____, as originally filed
pages _____, as amended (together with any statement) under Article 19
pages _____, filed with the demand
pages 14-15, filed with the letter of 22 February 2002
- ☒ the drawings:
pages 1/1, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____
- ☐ the sequence listing part of the description:
pages _____, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language English which is

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☒ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☒ The amendments have resulted in the cancellation of:

- ☐ the description, pages _____
- ☒ the claims, Nos. 7-13
- ☐ the drawings, sheet _____

5. ☐ This opinion has been drawn as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this opinion as "originally filed." and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

** Any replacement sheet containing such amendments must be referred to under item I and annexed to this report.

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**1. Statement**

Novelty (N)	Claims	1-6	YES
	Claims		NO
Inventive step (IS)	Claims	1-6	YES
	Claims		NO
Industrial applicability (IA)	Claims	1-6	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)

Reference is made to the following document:

D1: KR-A-1999-65688

1. The subject matter of present independent claims 1 and 5 is a method for preparing bean curd; the method comprises the step of preparing lactic acid bacteria culture by fermenting a mixture of vegetables and/or fruits, salt, sugar and water, and the step of adding it to the bean soup.

D1 is considered to be the closest prior art document in the search report. It discloses adding lactic acid bacteria to the bean soup to curdle the soy protein and to form tofu (bean curd).

The subject matter of present claims 1 and 5 is not referred to in the cited prior art. Thus the novelty of the subject matter can be acknowledged (Article 33(2) PCT).

2. The subject matter of present claims 1 and 5 differs from D1 in that a method for curdling soy protein comprises the steps of preparing a lactic acid bacteria culture and adding it to the the bean soup. It cannot be easily derived from adding lactic acid bacteria to the bean soup. Additionally, it cannot be easily chosen by a person skilled in the tofu production field. Therefore an inventive step can be acknowledged for the subject matter of claims 1 and 5 (Article 33(3) PCT).

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/KR00/01461

VI. Certain documents cited

1. Certain published documents (Rule 70.10)

Application No. Patent No.	Publication date (day/month/year)	Filing date (day/month/year)	Priority date (valid claim) (day/month/year)
KR-A-1999-65688	05/08/1999	16/01/1998	

2. Non-written disclosures (Rule 70.9)

Kind of non-written disclosure	Date of non-written disclosure (day/month/year)	Date of written disclosure referring to non-written disclosure (day/month/year)

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

T/KR00/01461

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

The sentence "the lactic acid bacteria culture is lactic acid bacteria" in claim 2 is unclear, thereby resulting in lack of clarity (Article 6 PCT) when used to interpret claim.

**BEAN CURD CONTAINING LACTIC ACID BACTERIA CULTURE
FLUID AND A METHOD FOR PREPARING THE SAME, AND BEVERAGE**

**~~CONTAINING LACTIC ACID BACTERIA AND A METHOD FOR
PREPARING THE SAME~~**

ART 34 AMDT

BACKGROUND OF THE INVENTION

(a) Field of the Invention

The present invention relates to a method for preparing bean curd containing lactic acid bacteria culture, and to bean curd prepared according to the method, to a beverage containing lactic acid bacteria, and to a method for preparing the same. Specifically, the present invention relates to a method for preparing bean curd containing lactic acid bacteria by adding lactic acid bacteria culture to bean soup, and bean curd prepared according to the method, a method for preparing a beverage containing lactic acid using bean soup remaining after preparing the bean curd, and a beverage containing lactic acid prepared according to the method.

(b) Description of the Related Art

Proteins separated from beans can be denatured from soluble proteins to non-soluble proteins according to the concentration of salts, and these non-soluble proteins are compressed to make a bean curd that is loved by Orientals. In addition, positive health effects from foods made with beans, such as bean curd, have been newly found.

Beans are known to have anticancer effects due to lecithin, and to contain other healthful ingredients. For examples, an anticancer drug and a

hypotensive are separated from soybean paste made from beans, and bean sprouts contain asparagine which protects the liver from hangovers.

However, bean curds are conventionally prepared using brine, and a new preparation method of bean curds has not been developed from the conventional method. Brine is a by-product obtained when sea salt absorbs moisture in the air due to its deliquescence property to dissolve and wash away ingredients other than the salts, over a long period of time. Accordingly, brine comprises various dissolved ingredients which are contained in sea water, including cations such as magnesium that are known to play an important role in making bean curds.

A deficiency in magnesium causes serious health problems since magnesium ions are physiologically important, but a high intake thereof can also cause physical problems. In addition, unpurified salts generate a bitter taste due to magnesium ions.

Accordingly, it can be predicted that the magnesium intake of Koreans exceeds a sufficient amount since bean curds made using brine are presently sold on the market, and unpurified salts are used in homes. Although the amount of magnesium intake from bean curds is not excessive because the amount of magnesium remaining in bean curds is not large, since Koreans habitually use sauces including fermented soybeans, considering the amount of magnesium contained in sauces, they consume an excessive amount of magnesium and are consequently attacked by related diseases of adults.

In addition, the taste of bean curds can be good while they are hot, but it cannot be preserved for a long time even if stored cold.

Particularly, bean curds are difficult to preserve for even one day without refrigeration, and microorganisms can grow under conditions in which constituents other than protein contained in beans remain even in trace amounts. However, there is no remedy for these problems.

Bean curds containing lactic acid are presently sold on the market, and Korean Patent Application No. 98-1089 discloses a method for preparing bean curds by lactic acid fermentation. However, according to the method, lactic acid is fermented and aged in soybeans to prepare bean curds containing lactic acid, and the method has a disadvantage in that manufacturing costs are high because it uses expensive dairy products such as milk as well as beans, etc. as raw materials.

SUMMARY OF THE INVENTION

The present invention is made to solve these problems, and it is an object of the present invention to provide a method for preparing bean curds by using lactic acid bacteria culture, and to provide bean curds prepared according to the method. According to the method of the present invention, bean curds are prepared using lactic acid bacteria culture thereby eliminating factors hazardous to health, the lactic acid in lactic acid fermenting foods such as Kimchi is used thereby decreasing manufacturing costs, and the growth of Gram negative bacteria is inhibited due to lactic acid and lactic acid bacteria, thereby increasing storage properties and microbiological safety of

bean curds.

It is another object of the present invention to provide a method for preparing a beverage containing lactic acid using bean soup remaining after preparing bean curds according to the above method, and to provide a
5 beverage containing lactic acid prepared according to the method.

In order to achieve these objects, the present invention provides a method for preparing bean curds by adding lactic acid bacteria culture comprising the steps of:

- a) preparing lactic acid bacteria culture by fermenting i) salt, sugar,
10 water and ii) material which is one or more selected from a group consisting of vegetables, fruits, and a mixture thereof with lactic acid bacteria;
- b) preparing the bean soup by pulverizing the soaked soybeans in water, heating, and filtering; and
- 15 c) adding the lactic acid bacteria culture of step a) to the bean soup cooled at 40 °C.

In addition, the present invention provides bean curds prepared according to the method.

Specifically, the bean curds prepared according to the present
20 invention comprises living lactic acid bacteria that increases the preservation property of bean curds compared to conventional bean curds, and also increases probability that lactic acid reaches the intestine when the bean curds are digested to increase intestine-cleaning effects.

The lactic acid bacteria culture is preferably prepared by mixing one or more of vegetables, fruits and mushrooms at room temperature using purified water such as tapped water in a basic medium comprising 2.5% salts and 1 % sugar. Although the lactic acid bacteria can be prepared at room
5 temperature without sterilization, sterilizing and aseptic operation should be preceded with for commercial production.

Favorable lactic acid bacteria existing in Kimchi are found in the lactic acid bacteria culture prepared as the above.

Any vegetables including radishes, cabbages, etc. can be used as
10 the vegetables, and any fruit including pears, pineapples, etc. can be used as the fruits.

In addition, bean curd dregs which is solid components produced after filtering heated soybeans, can be added to one material or more selected from vegetables, fruits, and mushrooms. Specifically, the bean
15 curd dregs can be utilized as good nitrogen and carbon sources when culturing lactic acid bacteria, because they are pulverized beans and can be further decomposed using microorganism enzymes. The bean curd dregs can be a substitute for medium for culturing the lactic acid, it cuts down the production cost.

20 Lactic acid bacteria have a property of inhibiting the growths of disease-causing bacteria and harmful bacteria because of the lactic acid produced by lactic acid fermentation, and they are used as a medicine for intestinal disorders because they inhabit the intestine to prevent abnormal

fermentation of various bacteria. In addition, they are Gram positive and are common anaerobic or anaerobic bacteria, they have no motility, most are catalase negative, and they require various vitamins, amino acids, peptides, etc. for their growth. These lactic acid bacteria are largely classified into

5 lactic acid bacillus and lactic acid micrococcus.

The representative example of the lactic acid bacillus is lactic acid bacteria pertaining to the genus *Lactobacillus*, which are aerobic lactic acid bacteria existing in the intestine of all mammals and in other animals, and are used to treat autopoisoning of the intestine.

10 The lactic acid micrococcus is further classified into the genera *Streptococcus*, *Pediococcus* and *Leuconostoc*, the lactic acid bacteria pertaining to the genus *Pediococcus* is streptococcus, and *P. pentosaceus* is mainly found in Kimchi. In addition, lactic acid bacteria pertaining to the genus *Leuconostoc* are diplococcus and *L. mesenteroides* produce a lot of

15 gluten-like substance from sugar.

In the present invention, lactic acid bacteria pertaining to the genus *Leuconostoc* are preferably produced, because they are found in lactic acid fermenting foods such as Kimchi, they produce a similar amount of lactic acid as lactic acid bacteria pertaining to other genera and they are

20 inexpensive.

The degree of lactic acid production decreases to pH 5.0 or lower within 48 hours after fermentation in the case of natural fermentation, thereby inhibiting the growth of non-acid resistant bacteria. Lactic acid

bacteria culture undergoing sufficient lactic acid production for 72 hours or more is preferably used. Other lactic acid bacteria can be used to prepare bean curd by controlling growth conditions when preparing lactic acid bacteria culture.

5 The preferable lactic acid bacteria culture is from Kimchi.

In addition, bean curd is conventionally prepared in hot conditions by boiling bean soup, while in the present invention, lactic acid bacteria culture is added to bean soup after the bean soup is cooled so that the bean curd contains living lactic acid bacteria. Thus, even when cooked at high
10 temperature, although lactic acid bacteria cannot survive, the effect of the lactic acid intake lasts and adult disease prevention and intestine cleaning effects are shown, and the bean curd preserving effect is still shown until that point.

The temperature to which to cool the bean soup is preferably 40 °C
15 or less.

Conventionally, in order to prepare bean curd, raw material soybeans are carefully selected and adulterants other than soybeans are removed. After selection, the soybeans are washed well and soaked in water to sufficiently absorb water. At this point, the weight of the soybeans
20 increases by approximately 2.2 to 2.3 times. The soybeans are pulverized while absorbing water, and the pulverized soybeans are heated to approximately 100 °C using sour milk neutralized with $\text{Ca}(\text{OH})_2$ or silicon resin as a deformer. The heated pulverized soybeans are filtered to obtain

bean soup, and the bean soup is coagulated at 70 to 75 °C using brine or CaCl_2 , etc., while stirring, to obtain bean curd. In the present invention, after coagulating the bean soup at 70 to 75 °C, the heated pulverized soybeans are cooled, and lactic acid bacteria culture is added to the cooled
5 soybeans without using brine or CaCl_2 to coagulate the bean soup, thereby preparing bean curd comprising lactic acid bacteria.

The present invention also provides a method for preparing a beverage containing lactic acid bacteria as the above by mixing bean soup remaining after preparing bean curd using the lactic acid bacteria culture with
10 syrup or fruit juice.

For example of the present invention, a beverage containing lactic acid bacteria as the above comprising the steps of:

- a) preparing lactic acid bacteria culture by fermenting i) salt, sugar, water and ii) material which is one or more selected from a
15 group consisting of vegetables, fruits, and a mixture thereof with lactic acid bacteria;
- b) preparing the bean soup by pulverizing the soaked soy bean in water, heating, and filtering;
- c) adding the lactic acid bacteria culture of step a) to the bean soup
20 cooled at 40 °C; and
- d) mixing syrup or fruit juice with the bean soup remaining after preparing bean curds of step c).

The present invention also provides a lactic acid beverage.

The bean soup remaining after preparing bean curd contains various organic substances such as amino acids, vitamins, fiber, etc., inorganic salts and important lactic acid bacteria. Thus a healthy lactic acid beverage can be prepared by adding additives containing appropriate favors such as syrup
5 or fruit juice, etc. to the bean soup.

Accordingly, as shown in Fig. 1, lactic acid bean curd can be prepared by preparing bean soup using soybeans, cooling it at 40 °C and introducing lactic acid bacteria culture into the cooled bean soup, and it can also be prepared by preparing lactic acid bacteria culture using bean dregs
10 remaining after preparing bean soup and introducing the lactic acid bacteria culture into the cooled bean soup. Also, lactic acid beverage can be prepared by adding additives such as syrup and fruit juice to the bean dregs remaining after preparing bean curd.

In addition, the present invention can be prepared bean curd adding
15 the lactic acid bacteria culture, and prepared bean curd adding organic acid.

For example of the present invention, a bean curd as the above comprising the steps of:

- a) soaking soybeans in water;
- b) pulverizing the soaked soybeans of step a);
- 20 c) heating the pulverized soybeans of step b) using a deformer;
- d) filtering the heated pulverized soybeans of step c) to prepare bean soup; and
- e) cooling at 40 °C the bean soup of step d) and adding lactic acid

thereto.

The organic acid is preferably lactic acid or acetic acid.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 shows a process chart for preparing lactic acid bean curd and
5 a lactic acid beverage according to one embodiment of the present invention.

DETAILED DESCRIPTION AND THE PREFERRED EMBODIMENTS

The present invention will now be explained with reference to the following Examples. However, these are to illustrate the present invention and the present invention is not limited to them.

10 Examples 1 – 7

50 g of cabbage, 60 g of garlic, 100 g of pear, 40 g of unripe hot peppers, 65 g of pineapple, 10 g of potatoes and 75 g of radish were weighed and introduced into each 360 mL bottles. A mixture of salts and sugar was prepared by mixing 100 g of salts, 40 g of sugar, and water such
15 that the mixture reached 4 L. 330, 337, 301, 347, 337, 290 and 284 mL of the mixture were respectively introduced into each bottle, and the bottles were left to stand at room temperature for 3 days.

The pH of the lactic acid bacteria culture prepared according to the Examples 1 – 7 was 3.5.

20 Comparative Example 1

The solution was prepared by mixing salts, sugar and water. The pH of the solution was 6.0.

Examples 8 – 14

Bean curds for Examples 8 to 14 were prepared by adding 3 mL of soybean milk (Samyook soybean milk) to 2 mL of the lactic acid bacteria culture prepared for each of Examples 1 to 7.

Example 15

- 5 Bean curd was prepared by adding 3 mL of soybean milk (Samyook soybean milk) to 2 mL of vinegar (Double Strength Apple Vinegar, from Otugi Food Company).

Comparative Example 2

- Bean curd was prepared by adding 3 mL of soybean milk to 2 mL of
10 the solution of Comparative Example 1.

Comparative Example 3

Bean curd was prepared by the same method as in Comparative Example 2, except that only soybean milk was used, with no solution.

The results are presented in the following Table 1.

- 15 [Table 1]

	Coagulation
Example 8	O
Example 9	O
Example 10	O
Example 11	O
Example 12	O
Example 13	O
Example 14	O

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Example 15	O
Comparative Example 2	X
Comparative Example 3	X

As can be seen from the Table 1, in Examples 8 to 14 according to the present invention, soybean milk was coagulated after the lactic acid bacteria culture was introduced to prepare bean curd, while, and it did so quickly, while in Comparative Examples 2 and 3 where the lactic acid bacteria culture was not introduced, soybean milk was not coagulated. Particularly, in the case when radish was used, soybean milk was most rapidly coagulated to prepare bean curd. In addition, even when organic acid such as vinegar was directly added during the bean curd preparing process, soybean milk was coagulated, which indicates that bean curd can be prepared using organic acid.

The present invention uses fermented lactic acid bacteria culture to prepare bean curd, thereby standardizing a bean curd preparation method, and prepares bean curd and a beverage containing lactic acid with improved preservation properties, and increases lactic acid intake thereby improving peoples' health.

In addition, the present invention prepares lactic acid containing bean curd and a beverage by fermenting lactic acid bacteria culture using bean curd dregs that are by-product produced when preparing bean curd and introducing it during the bean curd preparation process. thereby

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decreasing preparation costs of bean curd and lactic acid beverages and
providing bean curd and a beverage rich in lactic acid.

AMENDED SHEET (ART. 34)

WHAT IS CLAIMED IS:

1. A method for preparing bean curd comprising the steps of:
 - a) preparing lactic acid bacteria culture by fermenting i) salt, sugar, water and ii) material which is one or more selected from a group consisting of vegetables, fruits, and a mixture thereof with lactic acid bacteria;
 - b) preparing the bean soup by pulverizing the soaked soy bean in water, heating, and filtering; and
 - c) adding the lactic acid bacteria culture of step a) to the bean soup cooled at 40 °C .
2. The method for preparing bean curd according to claim 1, wherein the lactic acid bacteria culture of step a) is lactic acid bacteria existing in Kimchi.
3. The method for preparing bean curd according to claim 1, wherein the vegetable is cabbage or radish, and the fruit is pear or pineapple.
4. Bean curd prepared according to method in any one of claim 1.
5. A method for preparing beverage containing lactic acid bacteria comprising the steps of:
 - a) preparing lactic acid bacteria culture by fermenting i) salt, sugar, water and ii) material which is one or more selected from a group consisting of vegetables, fruits, and a mixture thereof with lactic acid bacteria;
 - b) preparing the bean soup by pulverizing the soaked soy bean in

water, heating, and filtering;

c) adding the lactic acid bacteria culture of step a) to the bean soup cooled at 40 °C; and

d) mixing syrup or fruit juice with the bean soup remaining after

5 preparing bean curds of step c).

p → 6. beverage prepared according to claim 5.

ART 34 AMDT**PCT/KR00/01461****IPEA/KR 22.02.2002****ABSTRACT**

The present invention relates to a method for preparing bean curd using lactic acid bacteria culture, and to a lactic acid beverage, and to a method for preparing the same. Specifically, the present invention provides

5 a method for preparing bean curd containing lactic acid by preparing bean soup using soybeans, cooling the bean soup and adding lactic acid bacteria culture to the bean soup, and the bean curd prepared according to the method, and a method for preparing a lactic acid beverage by adding syrup or fruit juice to the bean soup remaining after preparing the bean curd, and

10 the lactic acid beverage prepared according to the method.

[별지 제65호의48서식]

SUBMISSION OF CORRECTION

To : Commissioner of
the Korean Industrial Property Office

International Application No.		PCT/KR00/01461	International Filing Date	14 December 2000 (14.12.2000)	Priority Date	17 December 1999 (17.12.1999)
Applicant	Name	Microbia Corporation Limited. et al.		Residence Reg. No.	Country of Nationality	Republic of Korea
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- ☐ Submitted hereby is a correction pursuant to Article 106-33(2) of the Enforcement Regulations of the Patent Law.
- ☐ Submitted hereby is a correction pursuant to Article 106-36(3) of the Enforcement Regulations of the Patent Law.

Date(day/month/year) 22/02/2002

Applicant (Agent) KIM, Won-Ho (Seal)

※ Attached Document(s) :

- Two copies of written amendments
- A copy of the document(s) substantiating the power of attorney, if any

STATEMENT

We wish the international preliminary examination to be carried out on the basis of the specification and the claims as amended for clarification. Please be informed that the page and line number as indicated below refer to the new set of specification and claims.

We would like to amend the following terms described in the specification and the claims for clarification.

Lactic acid fermenting bacteria culture supernatant → lactic acid bacteria culture
Lactic acid fermenting bacteria → lactic acid bacteria

We also would like to modify subsequent words or phrases. The underscored words and phrases represent added or amended ones for correction and detailed description. The underscored parts show words or phrases added for clarification, and the bracketed and marked-up parts show words or phrases for deletion.

In the specification:

Page 1, line 12: lactic acid bacteria by adding ~

Page 1, line 13: bean soup, and bean curd prepared ~,

Page 4, lines 10 to 16: a) preparing lactic acid bacteria culture by fermenting i) salt, sugar, water and ii) material which is one or more selected from a group consisting of vegetables, fruits, and a mixture thereof with lactic acid bacteria;
b) preparing the bean soup by pulverizing the soaked soybeans in water, heating, and filtering ; and
c) adding the lactic acid bacteria culture of step a) to the bean soup cooled at

40 °C [~~a) soaking soy beans in water; b) pulverizing the soaked soybeans of step a); c) heating the pulverized soybeans of step b) using a deformer; d) filtering the heated pulverized soybeans of step c) to prepare bean soup; and e) cooling the bean soup of step d) and adding a lactic acid culture supernatant~~].

Page 5, line 1: the lactic acid bacteria culture [supernatant] is preferably ~

Page 5, line 6: ~ for commercial production. Favorable lactic acid bacteria existing in Kimchi are found in the lactic acid bacteria culture prepared as the above.

Page 5, lines 12 to 14: In addition, bean curd dregs, which is solid components produced after filtering heated soybeans, can be added to one material or more selected from vegetables, fruits, and mushrooms. Specifically, the bean curd dregs can be utilized as good nitrogen and carbon sources when culturing lactic acid bacteria, because they are pulverized beans and can be further decomposed using microorganism enzymes. The bean curd dregs can be a substitute for medium for culturing the lactic acid, it cuts down the production cost [~~produced after filtering the heated soybeans can be further added to the lactic acid fermenting bacteria culture supernatant~~].

Page 5, lines 10 to 11: [~~The preferable lactic acid fermenting bacteria culture supernatant is from Kimchi.~~]

Page 5, lines 15 to 17: [~~Favorable lactic acid fermenting bacteria existing in Kimchi are found in the lactic acid fermenting bacteria culture supernatant prepared as the above.~~]

Page 7, lines 2: ~ preparing lactic acid bacteria culture. The preferable lactic acid bacteria culture is from Kimchi.

Page 8, lines 5 to 16: [~~In addition, the lactic acid fermenting bacteria culture supernatant can be prepared using bean curd dregs produced after filtering heated~~

soybeans.

~~Specifically, the solid ingredients produced after preparing bean soup can be utilized as good nitrogen and carbon sources when producing lactic acid, because they are pulverized beans and can be further decomposed using microorganism enzymes. Thus they can decrease costs of the expensive lactic acid bacteria producing medium. Accordingly, the present invention uses them to prepare lactic acid fermenting bacteria culture supernatant in which lactic acid is fermented, and provides a method for preparing bean curd using the lactic acid fermenting bacteria culture supernatant.]~~

Page 8, lines 20: ~ with syrup or fruit juice. For example of the present invention, a beverage containing lactic acid bacteria as the above comprising the steps of:

- a) preparing lactic acid bacteria culture by fermenting i) salt, sugar, water and ii) material which is one or more selected from a group consisting of vegetables, fruits, and a mixture thereof with lactic acid bacteria;
- b) preparing the bean soup by pulverizing the soaked soy bean in water, heating, and filtering;
- c) adding the lactic acid bacteria culture of step a) o the bean soup cooled at 40 °C; and
- d) mixing syrup or fruit juice with the bean soup remaining after preparing bean curds of step c).

Page 9, line 5: cooling it at 40 °C and introducing ~

Page 9, lines 13 to 14: in addition, the present invention can be prepared bean curd adding the lactic acid bacteria culture, and prepared bean curd adding organic acid.

For example of the present invention, a bean curd as the above comprising the steps of:

Page 9, line 20: e) cooling at 40 °C the bean soup ~.

Page 9, lines 21 to 23 and page 10, line 1: [~~As mentioned above, according to the present invention, bean curd can be prepared by adding lactic acid fermenting bacteria culture supernatant, or by directly adding organic acid during the bean curd preparation process.~~]

Page 10, lines 3 to 4: [~~In addition, the temperature for cooling the bean curd is preferably 40 °C or less.~~]

Page 10, line 20: the pH of the lactic acid bacteria culture [~~supernatant~~] prepared ~.

Page 11, line 2: [~~Preparative~~] Examples 8 – 14 [~~1 – 7~~]

Page 11, line 3: bean curds for [~~each Preparative~~] Examples 8 to 14 were prepared~.

Page 11, lines 4 to 5: ~ to 2 mL of the lactic acid bacteria culture [~~supernatant~~] prepared ~.

Page 11, line 6; [~~Preparative~~] Example 15 [8].

Page 11, lines 10 and 14 to 15 : Comparative [~~Preparative~~] Example 2 [4].

Page 11, line 13: Comparative [~~Preparative~~] Example 3 [2].

Page 11, line 19: in the Table 1: [~~Preparative~~] Example 8 [4], [~~Preparative~~] Example 9 [2], [~~Preparative~~] Example 10 [3], [~~Preparative~~] Example 11 [4], [~~Preparative~~] Example 12 [5], [~~Preparative~~] Example 13 [6], [~~Preparative~~] Example 14 [7], [~~Preparative~~] Example 15 [8], Comparative [~~Preparative~~] Example 2 [4], Comparative [~~Preparative~~] Example 3 [2].

Page 12, line 2: [~~Preparative~~] Examples 8 to 14 [~~1 to 7~~].

Page 12, line 5: Comparative [~~Preparative~~] Examples 1 and 2 [~~2 and 3~~].

In the claims

All claims originally filed on the international filing date are replaced with the new set of claims as follows.

1. A method for preparing bean curd comprising the steps of:
 - a) preparing lactic acid bacteria culture by fermenting i) salt, sugar, water and ii) material which is one or more selected from a group consisting of vegetables, fruits, and a mixture thereof with lactic acid bacteria;
 - b) preparing the bean soup by pulverizing the soaked soy bean in water, heating, and filtering; and
 - c) adding the lactic acid bacteria culture of step a) to the bean soup cooled at 40 °C.
2. The method for preparing bean curd according to claim 1, wherein the lactic acid bacteria culture of step a) is lactic acid bacteria existing in Kimchi.
3. The method for preparing bean curd according to claim 1, wherein the vegetable is cabbage or radish, and the fruit is pear or pineapple.
4. Bean curd prepared according to method in any one of claim 1.
5. A method for preparing beverage containing lactic acid bacteria comprising

the steps of:

- a) preparing lactic acid bacteria culture by fermenting i) salt, sugar, water and ii) material which is one or more selected from a group consisting of vegetables, fruits, and a mixture thereof with lactic acid bacteria;
 - b) preparing the bean soup by pulverizing the soaked soy bean in water, heating, and filtering;
 - c) adding the lactic acid bacteria culture of step a) to the bean soup cooled at 40 °C; and
 - d) mixing syrup or fruit juice with the bean soup remaining after preparing bean curds of step c).
6. beverage prepared according to claim 5.

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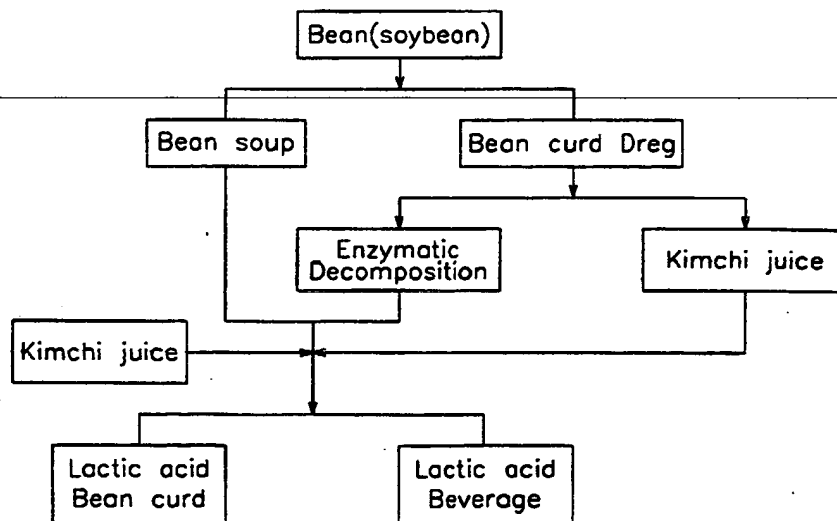
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[Continued on next page]

(54) Title: BEAN CURD CONTAINING LACTIC ACID FERMENTING BACTERIA CULTURE FLUID AND A METHOD FOR PREPARING THE SAME, AND BEVERAGE CONTAINING LACTIC ACID FERMENTING BACTERIA AND A METHOD FOR PREPARING THE SAME



(57) Abstract: The present invention relates to a method for preparing bean curd using lactic acid fermenting bacteria culture fluid and lactic acid beverage and methods for preparing the same. Specifically, the present invention provides a method for preparing bean curd containing lactic acid by preparing bean soup using soybeans, cooling the bean soup and adding lactic acid fermenting bacteria culture fluid to the bean soup and the bean curd prepared according to the method, and a method for preparing lactic acid beverage by adding syrup or fruit juice to the bean soup remaining after preparing the bean curd and the lactic acid beverage prepared according to the method.



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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

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**BEAN CURD CONTAINING LACTIC ACID FERMENTING BACTERIA
CULTURE FLUID AND A METHOD FOR PREPARING THE SAME, AND
BEVERAGE CONTAINING LACTIC ACID FERMENTING BACTERIA AND
A METHOD FOR PREPARING THE SAME**

5

BACKGROUND OF THE INVENTION

(a) Field of the Invention

The present invention relates to a method for preparing bean curd containing lactic acid fermenting bacteria culture supernatant, and to bean curd prepared according to the method, to a beverage containing lactic acid fermenting bacteria, and to a method for preparing the same. Specifically, the present invention relates to a method for preparing bean curd containing lactic acid by adding lactic acid fermenting bacteria culture supernatant to bean soup and bean curd prepared according to the method, a method for preparing a beverage containing lactic acid using bean soup remaining after preparing the bean curd, and a beverage containing lactic acid prepared according to the method.

(b) Description of the Related Art

Proteins separated from beans can be denatured from soluble proteins to non-soluble proteins according to the concentration of salts, and these non-soluble proteins are compressed to make a bean curd that is loved by Orientals. In addition, positive health effects from foods made with beans, such as bean curd, have been newly found.

Beans are known to have anticancer effects due to lecithin, and to contain other healthful ingredients. For examples, an anticancer drug and a hypotensive are separated from soybean paste made from beans, and bean sprouts contain asparagine which protects the liver from hangovers.

- 5 However, bean curds are conventionally prepared using brine, and a new preparation method of bean curds has not been developed from the conventional method. Brine is a by-product obtained when sea salt absorbs moisture in the air due to its deliquescence property to dissolve and wash away ingredients other than the salts, over a long period of time.
- 10 Accordingly, brine comprises various dissolved ingredients which are contained in sea water, including cations such as magnesium that are known to play an important role in making bean curds.

A deficiency in magnesium causes serious health problems since magnesium ions are physiologically important, but a high intake thereof can

15 also cause physical problems. In addition, unpurified salts generate a bitter taste due to magnesium ions.

- Accordingly, it can be predicted that the magnesium intake of Koreans exceeds a sufficient amount since bean curds made using brine are presently sold on the market, and unpurified salts are used in homes.
- 20 Although the amount of magnesium intake from bean curds is not excessive because the amount of magnesium remaining in bean curds is not large, since Koreans habitually use sauces including fermented soybeans,

considering the amount of magnesium contained in sauces, they consume an excessive amount of magnesium and are consequently attacked by related diseases of adults.

In addition, the taste of bean curds can be good while they are hot,
5 but it cannot be preserved for a long time even if stored cold.

Particularly, bean curds are difficult to preserve for even one day without refrigeration, and microorganisms can grow under conditions in which constituents other than protein contained in beans remain even in trace amounts. However, there is no remedy for these problems.

10 Bean curds containing lactic acid are presently sold on the market, and Korean Patent Application No. 98-1089 discloses a method for preparing bean curds by lactic acid fermentation. However, according to the method, lactic acid is fermented and aged in soybeans to prepare bean curds containing lactic acid, and the method has a disadvantage in that
15 manufacturing costs are high because it uses expensive dairy products such as milk as well as beans, etc. as raw materials.

SUMMARY OF THE INVENTION

The present invention is made to solve these problems, and it is an object of the present invention to provide a method for preparing bean curds
20 by using lactic acid fermenting bacteria culture supernatant, and to provide bean curds prepared according to the method. According to the method of the present invention, bean curds are prepared using lactic acid fermenting

bacteria culture supernatant thereby eliminating factors hazardous to health, the lactic acid in lactic acid fermenting foods such as Kimchi is used thereby decreasing manufacturing costs, and the growth of Gram negative bacteria is inhibited due to lactic acid and lactic acid fermenting bacteria, thereby
5 increasing storage properties and microbiological safety of bean curds.

It is another object of the present invention to provide a method for preparing a beverage containing lactic acid using bean soup remaining after preparing bean curds according to the above method, and to provide a beverage containing lactic acid prepared according to the method.

10 In order to achieve these objects, the present invention provides a method for preparing bean curds by adding lactic acid fermenting bacteria culture supernatant comprising the steps of:

- a) soaking soy-beans in water;
- b) pulverizing the soaked soybeans of step a);
- 15 c) heating the pulverized soybeans of step b) using a deformer;
- d) filtering the heated pulverized soybeans of step c) to prepare bean soup; and
- e) cooling the bean soup of step d) and adding a lactic acid culture supernatant.

20 In addition, the present invention provides bean curds prepared according to the method.

Specifically, the bean curds prepared according to the present

invention comprises living lactic acid fermenting bacteria that increases the preservation property of bean curds compared to conventional bean curds, and also increases probability that lactic acid reaches the intestine when the bean curds are digested to increase intestine-cleaning effects.

5 The lactic acid culture supernatant is preferably prepared by mixing one or more of vegetables, fruits and mushrooms at room temperature using purified water such as tapped water in a basic medium comprising 2.5% salts and 1 % sugar. Although the lactic acid fermenting bacteria can be prepared at room temperature without sterilization, sterilizing and aseptic
10 operation should be preceded with for commercial production.

Any vegetables including radishes, cabbages, etc. can be used as the vegetables, and any fruit including pears, pineapples, etc. can be used as the fruits.

The preferable lactic acid fermenting bacteria culture supernatant is
15 from Kimchi.

In addition, bean curd dregs produced after filtering the heated soybeans can be further added to the lactic acid fermenting bacteria culture supernatant.

Favorable lactic acid fermenting bacteria existing in Kimchi are found
20 in the lactic acid fermenting bacteria culture supernatant prepared as the above.

Lactic acid fermenting bacteria have a property of inhibiting the

growths of disease-causing bacteria and harmful bacteria because of the lactic acid produced by lactic acid fermentation, and they are used as a medicine for intestinal disorders because they inhabit the intestine to prevent abnormal fermentation of various bacteria. In addition, they are Gram
5 positive and are common anaerobic or anaerobic bacteria, they have no motility, most are catalase negative, and they require various vitamins, amino acids, peptides, etc. for their growth. These lactic acid fermenting bacteria are largely classified into lactic acid bacillus and lactic acid micrococcus.

The representative example of the lactic acid bacillus is lactic acid
10 bacteria pertaining to the genus *Lactobacillus*, which are aerobic lactic acid fermenting bacteria existing in the intestine of all mammals and in other animals, and are used to treat autopoisoning of the intestine.

The lactic acid micrococcus is further classified into the genera *Streptococcus*, *Pediococcus* and *Leuconostoc*, the lactic acid bacteria
15 pertaining to the genus *Pediococcus* is streptococcus, and *P. pentosaceus* is mainly found in Kimchi. In addition, lactic acid fermenting bacteria pertaining to the genus *Leuconostoc* are diplococcus and *L. mesenteroides* produce a lot of gluten-like substance from sugar.

In the present invention, lactic acid fermenting bacteria pertaining to
20 the genus *Leuconostoc* are preferably produced, because they are found in lactic acid fermenting foods such as Kimchi, they produce a similar amount of lactic acid as lactic acid bacteria pertaining to other genera and they are

inexpensive.

The degree of lactic acid production decreases to pH 5.0 or lower within 48 hours after fermentation in the case of natural fermentation, thereby inhibiting the growth of non-acid resistant bacteria. Lactic acid fermenting bacteria culture supernatant undergoing sufficient lactic acid production for 72 hours or more is preferably used. Other lactic acid fermenting bacteria can be used to prepare bean curd by controlling growth conditions when preparing lactic acid fermenting bacteria culture supernatant.

In addition, bean curd is conventionally prepared in hot conditions by boiling bean soup, while in the present invention, lactic acid fermenting bacteria culture supernatant is added to bean soup after the bean soup is cooled so that the bean curd contains living lactic acid fermenting bacteria. Thus, even when cooked at high temperature, although lactic acid fermenting bacteria cannot survive, the effect of the lactic acid intake lasts and adult disease prevention and intestine cleaning effects are shown, and the bean curd preserving effect is still shown until that point.

The temperature to which to cool the bean soup is preferably 40 °C or less.

Conventionally, in order to prepare bean curd, raw material soybeans are carefully selected and adulterants other than soybeans are removed. After selection, the soybeans are washed well and soaked in water to sufficiently absorb water. At this point, the weight of the soybeans

increases by approximately 2.2 to 2.3 times. The soybeans are pulverized while absorbing water, and the pulverized soybeans are heated to approximately 100 °C using sour milk neutralized with $\text{Ca}(\text{OH})_2$ or silicon resin as a deformer. The heated pulverized soybeans are filtered to obtain
5 bean soup, and the bean soup is coagulated at 70 to 75 °C using brine or CaCl_2 , etc., while stirring, to obtain bean curd. In the present invention, after coagulating the bean soup at 70 to 75 °C, the heated pulverized soybeans are cooled, and lactic acid fermenting bacteria culture supernatant is added to the cooled soybeans without using brine or CaCl_2 to coagulate
10 the bean soup, thereby preparing bean curd comprising lactic acid fermenting bacteria.

In addition, the lactic acid fermenting bacteria culture supernatant can be prepared using bean curd dregs produced after filtering heated soybeans.

15 Specifically, the solid ingredients produced after preparing bean soup can be utilized as good nitrogen and carbon sources when producing lactic acid, because they are pulverized beans and can be further decomposed using microorganism enzymes. Thus they can decrease costs of the expensive lactic acid bacteria producing medium. Accordingly, the
20 present invention uses them to prepare lactic acid fermenting bacteria culture supernatant in which lactic acid is fermented, and provides a method for preparing bean curd using the lactic acid fermenting bacteria culture

supernatant.

The present invention also provides a method for preparing a beverage containing lactic acid fermenting bacteria by mixing bean soup remaining after preparing bean curd using the lactic acid fermenting bacteria
5 culture supernatant with syrup or fruit juice.

The present invention also provides a lactic acid beverage.

The bean soup remaining after preparing bean curd contains various organic substances such as amino acids, vitamins, fiber, etc., inorganic salts and important lactic acid bacteria. Thus a healthy lactic acid beverage can
10 be prepared by adding additives containing appropriate favors such as syrup or fruit juice, etc. to the bean soup.

Accordingly, as shown in Fig. 1, lactic acid bean curd can be prepared by preparing bean soup using soybeans, cooling it and introducing lactic acid fermenting bacteria culture supernatant into the cooled bean soup,
15 and it can also be prepared by preparing lactic acid fermenting bacteria culture supernatant using bean dregs remaining after preparing bean soup and introducing the lactic acid fermenting bacteria culture supernatant into the cooled bean soup. Also, lactic acid beverage can be prepared by adding additives such as syrup and fruit juice to the bean dregs remaining
20 after preparing bean curd.

In addition, the present invention provides a method for preparing bean curd comprising the steps of:

- a) soaking soybeans in water;
 - b) pulverizing the soaked soybeans of step a);
 - c) heating the pulverized soybeans of step b) using a deformer;
 - d) filtering the heated pulverized soybeans of step c) to prepare bean
- 5 soup; and
- e) cooling the bean soup of step d) and adding lactic acid thereto.

As mentioned above, according to the present invention, bean curd can be prepared by adding lactic acid fermenting bacteria culture supernatant, or by directly adding organic acid during the bean curd

10 preparation process.

The organic acid is preferably lactic acid or acetic acid.

In addition, the temperature for cooling the bean curd is preferably 40 °C or less.

BRIEF DESCRIPTION OF THE DRAWINGS

15 Fig. 1 shows a process chart for preparing lactic acid bean curd and a lactic acid beverage according to one embodiment of the present invention.

DETAILED DESCRIPTION AND THE PREFERRED EMBODIMENTS

The present invention will now be explained with reference to the following Examples. However, these are to illustrate the present invention

20 and the present invention is not limited to them.

Examples 1 – 7

50 g of cabbage, 60 g of garlic, 100 g of pear, 40 g of unripe hot

peppers, 65 g of pineapple, 10 g of potatoes and 75 g of radish were weighed and introduced into each 360 mL bottles. A mixture of salts and sugar was prepared by mixing 100 g of salts, 40 g of sugar, and water such that the mixture reached 4 L. 330, 337, 301, 347, 337, 290 and 284 mL of the mixture were respectively introduced into each bottle, and the bottles were left to stand at room temperature for 3 days.

The pH of the culture supernatant prepared according to the Examples 1 – 7 was 3.5.

Comparative Example 1

10 The solution was prepared by mixing salts, sugar and water. The pH of the solution was 6.0.

Preparative Examples 1 – 7

Bean curds for each Preparative Example were prepared by adding 3 mL of soybean milk (Samyook soybean milk) to 2 mL of culture supernatant prepared for each of Examples 1 to 7.

Preparative Example 8

Bean curd was prepared by adding 3 mL of soybean milk (Samyook soybean milk) to 2 mL of vinegar (Double Strength Apple Vinegar, from Otugi Food Company).

20 Comparative Preparative Example 1

Bean curd was prepared by adding 3 mL of soybean milk to 2 mL of the solution of Comparative Example 1.

Comparative Preparative Example 2

Bean curd was prepared by the same method as in Comparative Preparative Example 1, except that only soybean milk was used, with no solution.

5 The results are presented in the following Table 1.

[Table 1]

	Coagulation
Preparative Example 1	O
Preparative Example 2	O
Preparative Example 3	O
Preparative Example 4	O
Preparative Example 5	O
Preparative Example 6	O
Preparative Example 7	O
Preparative Example 8	O
Comparative Preparative Example 1	X
Comparative Preparative Example 2	X

As can be seen from the Table 1, in Preparative Examples 1 to 7 according to the present invention, soybean milk was coagulated after the culture supernatant was introduced to prepare bean curd, while, and it did so
 10 quickly, while in Comparative Preparative Examples 1 and 2 where the

culture supernatant was not introduced, soybean milk was not coagulated. Particularly, in the case when radish was used, soybean milk was most rapidly coagulated to prepare bean curd. In addition, even when organic acid such as vinegar was directly added during the bean curd preparing
5 process, soybean milk was coagulated, which indicates that bean curd can be prepared using organic acid.

The present invention uses fermented lactic acid fermenting bacteria culture supernatant to prepare bean curd, thereby standardizing a bean curd preparation method, and prepares bean curd and a beverage containing
10 lactic acid with improved preservation properties, and increases lactic acid intake thereby improving peoples' health.

In addition, the present invention prepares lactic acid containing bean curd and a beverage by fermenting lactic acid fermenting bacteria culture supernatant using bean curd dregs that are by-product produced
15 when preparing bean curd and introducing it during the bean curd preparation process, thereby decreasing preparation costs of bean curd and lactic acid beverages and providing bean curd and a beverage rich in lactic acid.

WHAT IS CLAIMED IS:

1. A method for preparing bean curd comprising the steps of:
 - a) soaking soybeans in water;
 - b) pulverizing the soaked soybeans of step a);
 - 5 c) heating the pulverized soybeans of step b) using a deformer;
 - d) filtering the heated pulverized soybeans of step c) to prepare bean soup; and
 - e) cooling the bean soup and adding lactic acid fermenting bacteria culture supernatant thereto.
 - 10 2. The method for preparing bean curd according to claim 1, wherein the lactic acid of the culture supernatant of step e) is lactic acid existing in Kimchi.
 3. The method for preparing bean curd according to claim 1, wherein the lactic acid fermenting bacteria culture supernatant of step e) is prepared by mixing salt, sugar and one or more of vegetables, fruits and mushrooms and
 - 15 fermenting the mixture.
-
4. The method for preparing bean curd according to claim 3, wherein the lactic acid fermenting bacteria culture supernatant further comprises bean curd dregs.
 5. The method for preparing bean curd according to any one of claims 1 to
 - 20 3, wherein the lactic acid fermenting bacteria culture supernatant of step e) is Kimchi juice.
 6. The method for preparing bean curd according to claim 1, wherein the

lactic acid fermenting bacteria culture supernatant of step e) is prepared by fermenting salt, sugar, water and bean curd dregs.

7. The method for preparing bean curd according to claim 3 or claim 4, wherein the vegetables and fruits include all kinds of vegetables and fruits.

5 8. Bean curd prepared according to the method of claim 1.

9. Lactic acid beverage prepared by mixing syrup or fruit juice with the bean soup remaining after preparing the bean curd of claim 1.

10 10. A method for preparing a lactic acid beverage comprising the step of mixing syrup or fruit juice and the bean soup remaining after preparing the bean curd of claim 1.

11. A method for preparing bean curd comprising the steps of:

a) soaking soybeans in water;

b) pulverizing the soybeans of step a);

c) heating the pulverized soybeans of step b) using a deformer;

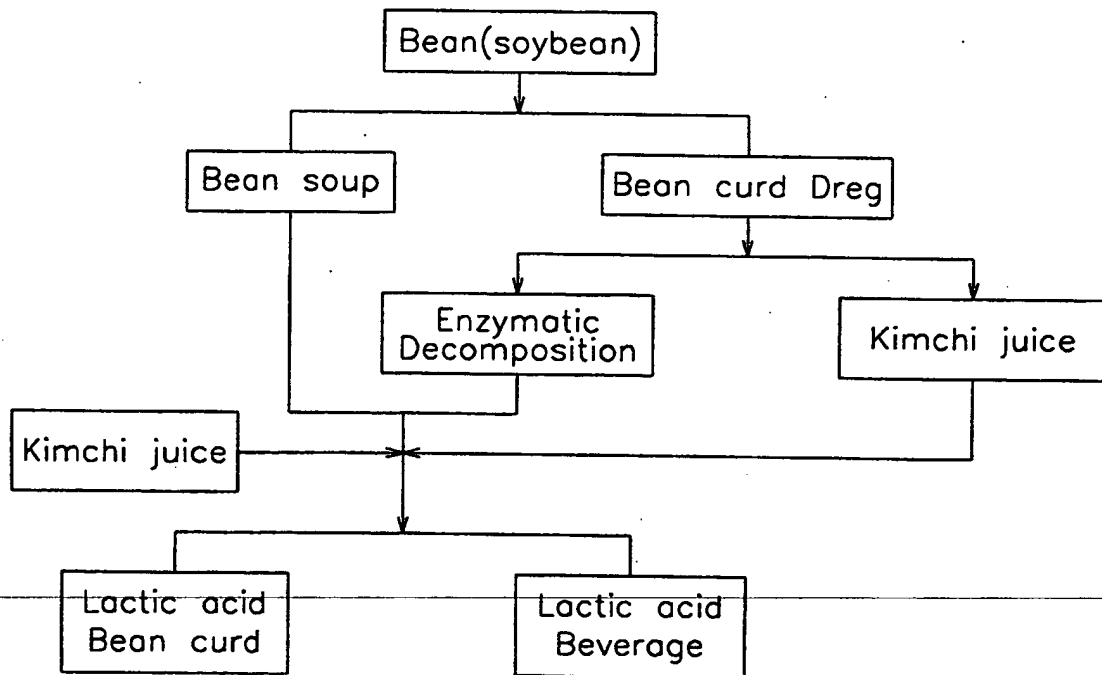
15 d) filtering the heated pulverized soybeans of step c) to prepare bean soup; and

e) cooling the bean soup of step d) and adding organic acid thereto.

12. The method for preparing bean curd according to claim 11, wherein the organic acid is lactic acid or acetic acid.

20 13. The method for preparing bean curd according to claim 1 or claim 11, wherein in step e) the temperature to which the bean soup is cooled is 40 °C or less.

FIG.1



INTERNATIONAL SEARCH REPORT

International application No.

PCT/KR00/01461

A. CLASSIFICATION OF SUBJECT MATTER

IPC7 A23L 1/20

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
NPS

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	KR 1999-0065688 A (HAI TAI CONFECTIONERY CO., LTD.) 05 August 1999 (05.08.99) see page 3, example 2; claim 1	1-2
X	KR 1998-0068758 A (JAE-SHIK SHIM) 26 October 1998 (26.10.98) see 3 and 4, examples 1 and 2; claims 1-3	11-12
X	KR 1983-0009733 A (CHUL-YOUNG JANG) 23 December 1983 (23.12.83) see claim 1	11-12

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

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Metropolitan City 302-701, Republic of Korea

Facsimile No. 82-42-472-7140

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Telephone No. 82-42-481-5631



INTERNATIONAL SEARCH REPORT

Information on patent family members

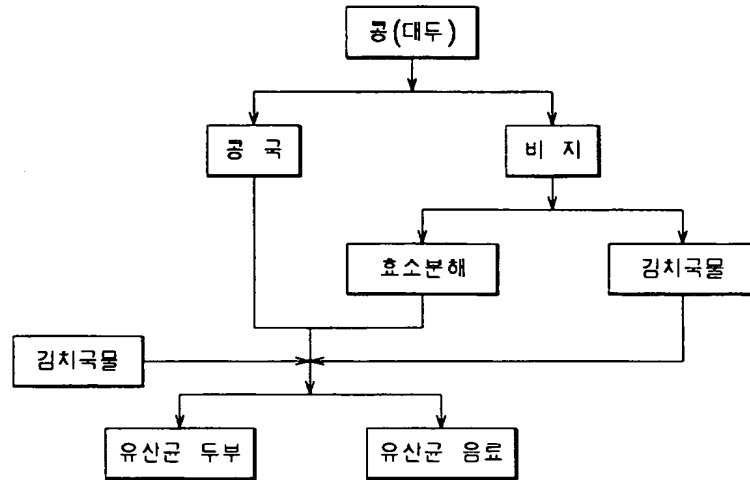
Information on patent family members

International application No.

PCT/KR00/01461

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
KR 1999-0065688 A	05.08.99	None	
KR 1998-0068758 A	26.10.98	None	
KR 1983-0009733 A	23.12.83	None	

도 1



유산균 배양액을 함유한 두부와 그의 제조 방법,
유산균을 함유한 음료 및 그의 제조 방법

발명의 대한 배경

5

(a) 발명이 속하는 기술분야

본 발명은 유산균 배양액을 이용한 두부의 제조 방법과 그 제조 방법에 의해 제조된 두부, 유산균을 함유한 음료 및 그의 제조 방법에 관한 것으로서, 더욱 상세하게는 두부의 제조 과정 중에서 유산균 배양액을
10 첨가함으로써 제조되는 유산균이 포함된 두부의 제조 방법 및 그 제조 방법에 의해 제조된 두부와 상기 두부 제조 후 발생하는 콩국 등을 이용하여 제조하는 유산균을 함유한 음료 및 그의 제조 방법에 관한 것이다.

(b) 종래기술

두부는 콩에서 분리되는 단백질이 염의 농도에 따라 수용성이었던
15 상태에서 불용성 단백질로 변성될 수 있고 이러한 불용성 단백질을 압축해 놓은 것으로서, 국내외적으로 동양계 사람들에게 의하여 사랑을 받고 있는 음식이며 이러한 콩으로 만들 수 있는 식품이 가지는 건강에 대한 의미가 해마다 새롭게 밝혀지고 있다.

콩은 레시틴에 의한 항암 효과가 알려져 있고 또한 콩으로 만들어진
20 된장에서는 항암제와 혈압 강하제가 정제되고, 콩나물에서는 숙취로부터 간장을 보호하는 알기닌(아지닌; arginine) 등의 중요한 성분들이 알려지는 등 여러 가지 건강에 유익한 성분들을 포함하고 있다.

그러나, 종래에 두부는 해수에서 채취한 "간수"라는 것을 이용하여 만들고 있으며, 이러한 두부의 제조 방법은 재래의 제조 방법에서 전혀
25 새롭게 발전하고 있지 못하다. 간수는 원래 깨끗한 소금을 얻기 위하여 소금을 오랫동안 공기 중에 보관하면서 소금의 조해(潮解)성을 이용하여 공기 중의 수분을 흡수하여 소금 자체 이외의 성분들이 녹아 씻겨 내리는 과정에서 얻게 되는 부산물이다. 따라서, 간수에는 해수에 들어있는 다양한 성분들이 녹아 있으며, 특히 마그네슘 등의 양이온이 바로 두부를

만드는데 중요한 역할을 하고 있다고 알려져 있다.

마그네슘 이온은 생리적으로 중요한 이온이므로 결핍 시에는 중대한 건강상의 문제를 일으키며, 또한 다량을 섭취하는 경우에도 신체적인 문제를 발생할 수 있으며, 정제되지 않은 소금을 사용하는 경우에는 마그네슘 이온에 의해 쓴맛을 느끼게 된다.

따라서, 현재 시중에서는 간수를 이용하여 만든 두부가 판매되고 있으며 또한, 상당수의 일반 가정에서도 정제되지 않은 소금을 사용하고 있으므로 한국인들이 섭취하는 마그네슘 이온의 양은 충분한 양을 넘고 있다고 추정할 수 있다. 물론, 두부 속에 잔류하는 이러한 성분의 양은 얼마 되지 않을 것이므로 두부를 섭취함으로써 섭취되는 마그네슘 이온의 양은 얼마되지 않을 것이라고 생각되지만, 오랫동안 한국인의 건강을 지켜준 음식인 메주 등에서 비롯되는 많은 장(醬)류 식품을 애용하는 한국인의 경우에는 상기 장류 음식에 포함된 마그네슘의 양을 고려하면 지나칠 만큼 섭취하게 됨으로써 성인병이 나타난다는 문제점이 있다.

또한, 두부의 경우에는 뜨끈뜨끈할 때 먹어야 두부 자체의 맛을 느낄 수 있고, 냉장 보관하는 경우에도 별로 오래 보관할 수 없다는 것이 상례이었다.

특히, 냉장고가 없던 시절에는 하루를 보관하기에도 어려움이 있었고, 콩에 들어있는 단백질 이외의 성분들이 미량이나마 남아있는 상태에서 미생물들이 생육할 수 있다는 것은 상식적이나 이러한 문제점에 대한 대비책이 없었다.

한편, 유산균을 이용한 두부가 현재 시판되고 있으며, 대한민국 특허출원 98-1089에서는 유산균 발효에 의한 두부의 제조 방법을 개시하고 있으나 여기에서는 유산균을 대두에서 호상으로 발효, 숙성시켜 유산균이 포함된 두부를 제조하는 방법으로 제조된 것이고, 또한 유산균을 발효하는 원료로는 우유, 콩 등과 같은 값비싼 유제품을 사용함으로써 제조 비용이 비싸다는 단점이 있다.

발명에 대한 요약

본 발명은 상기한 바와 같은 문제점을 해결하기 위하여 안출된 것으로서, 두부를 제조할 때 유산균이 배양된 액을 이용함으로써 표준화되지 못한 간수의 사용에 따른 성인병의 유발 등과 같은 국민 건강의 위해 (危害) 요소를 배제하고, 우리 국민이 오랫동안 섭취해 온 김치와 같은 유산 발효 식품과 동일한 개념의 유기산을 사용하여 값싸게 제조할 수 있고, 또한 유산과 유산균이 포함되어 있으므로 인하여 그람음성균의 생육이 억제되어 두부의 보존성 및 미생물학적인 관점에서의 안전도를 높인 두부를 제조하는 방법 및 그 제조 방법에 의해 제조된 두부를 제공하는 데 있다.

본 발명의 또 다른 목적은 상기의 두부를 제조하고 남은 콩국에는 유익한 물질들이 많이 포함되어 있으므로 이를 이용한 유산균을 함유한 음료 및 그의 제조 방법을 제공하고자 하는데 있다.

본 발명은 상기한 바와 같은 목적을 달성하기 위하여,

유산균 배양액을 첨가하여 두부를 제조하는 방법으로서,

- a) 대두를 물에 불리는 공정;
- b) 상기 a)의 대두를 마쇄하는 공정;
- c) 소포제를 사용하여 상기 b)의 마쇄된 대두를 가열하는 공정;
- d) 상기 c)의 가열한 마쇄 대두를 여과하여 콩국을 제조하는 공정;

및

- e) 상기 d)의 콩국을 식힌 후 유산균 배양액을 첨가하는 공정을 포함하는 두부의 제조 방법을 제공한다.

또한, 본 발명은 상기의 방법으로 제조된 두부를 제공한다.

즉, 본 발명에 따라 제조된 두부에는 두부 내부에 살아있는 유산균이 포함되게 함으로써 기존의 두부에 비하여 보관성을 높이고 섭취하였을 때 살아있는 유산균이 장에 도달하는 확률을 높여 정장효과를 높인다.

상기 유산균 배양액은 소금이 2.5 %, 설탕이 1 %를 기본 배지로 하며, 물은 수돗물과 같은 청정한 물을 사용하고, 실내 온도에서 채소류, 과일류 및 버섯으로 이루어진 군에서 선택되는 1 종 이상의 물질을 혼합하여 유산균 배양액을 제조하는 것이 바람직하다. 상기의 유산균 배양액

을 제조하는 경우에는 굳이 멸균할 필요가 없이 상온에서 제조할 수 있으나 산업화하는 경우에는 멸균 및 무균 조작을 전제로 한다.

상기 사용될 수 있는 채소류로는 배추, 무 등의 채소류 전체를 사용할 수 있으며, 과일류로는 배, 파일애플 등의 모든 과일류를 포함한다.

5 바람직한 유산균 배양액으로는 김치류 국물이 바람직하다.

또한, 상기 유산균 배양액에 가열한 대두를 여과하여 발생하는 찌꺼기인 콩비지를 더욱 첨가하여 사용할 수 있다.

상기와 같이 제조된 유산균 배양액에는 김치류에 존재하는 유익한 유산균이 발견된다.

10 유산균은 젖산 발효에 의해 생성되는 젖산에 병원균과 유해 세균의 생육이 억제되는 성질을 가지고 있으며, 포유류의 장내에 서식하여 장균에 의한 이상 발효를 방지하여 정장제로도 이용되는 중요한 세균이다. 그람양성균이며, 통성 혐기성 또는 혐기성 세균이다. 운동성은 없고 대부분이 카탈라아제 음성이고, 생육에는 각종 비타민, 아미노산, 펩티드 등
15 을 요구한다. 이러한 유산균은 젖산 간균(桿菌)과 젖산 구균(球菌)으로 크게 대별된다.

상기 젖산 간균으로는 대표적으로 락토바실루스속에 속하는 유산균이 있는데 이는 호기성 젖산균으로 사람 및 모든 포유류와 그 밖의 동물의 장에 존재하며, 장내 자가 중독의 치료에 사용된다.

20 젖산 구균으로는 스트렙토코쿠스속, 페디오코쿠스속 및 류코노스톡속으로 크게 대별되며, 페디오코쿠스속에 속하는 유산균은 4연구균이며, 페디오코쿠스 펜토사세우스(*P. pentosaceus*)는 주로 김치에서 발견된다. 또한, 류코노스톡속에 속하는 유산균은 쌍구균으로 이 속에 속하는 류코노스톡 메센테로이데스(*L. mesenteroides*)는 당질에서 다량의 점질을 생
25 성한다.

본 발명에서는 상기 혼합 유산균 중 류코노스톡(*Leuconostoc*)속(屬)에 속하는 유산균들은 김치 등의 유산발효 식품에서 발견되는 균들로 다른 속에 속하는 유산균과 서로 비슷한 정도로 유산을 생성하고 있고 비용이 저렴하므로 류코노스톡속에 속하는 유산균들이 생성되는 것이 바람

직하다.

유산의 생성 정도는 자연 발효의 경우 발효 시작 후 48 시간 이내에 pH 5.0 이하로 떨어져 비내산성 균의 성장을 억제하게 된다. 72 시간 이상의 충분한 유산 생성을 거친 유산균 배양액을 사용한다. 기타 상기
5 균총 이외에 속하는 모든 유산균들도 유산균 배양액 제조시 생육 조건의 조절에 의하여 두부 제조에 사용될 수 있다.

또한, 본 발명에서는 종래의 경우 콩국을 끓여서 뜨거운 상태에서 두부를 제조하는 데 비하여 본원 발명에서는 콩국을 식힌 후 유산균이 발효된 유산균 배양액을 상기 콩국에 첨가함으로써 살아있는 유산균이 포함
10 되어 찌개와 같이 고온 조리하는 경우에도 유산균은 생존할 수 없을 지라도, 유산의 섭취 효과는 살아있어 본 발명의 제조 방법으로 제조된 두부를 섭취하는 경우에도 성인병 예방과 정장 효과 등이 나타나며 그 때까지의 두부 보존 효과도 여전히 나타난다.

상기의 콩국을 식히는 온도는 40 °C 이하인 것이 바람직하다.

15 종래에는 두부를 제조하기 위하여 먼저, 원료 대두를 정선하여 대두 이외의 종실이나 헹잡물 등을 제거한다. 정선 후 잘 씻은 대두를 물에 담구어 충분히 흡수시키면 중량이 약 2.2 내지 2.3 배로 증가한다. 상기 물을 흡수한 대두를 물을 흡수하면서 마쇄한다. 상기 대두를 마쇄한 후 $\text{Ca}(\text{OH})_2$ 로 중화시킨 산패유나 실리콘 수지를 소포제를 사용하여
20 약 100 °C 정도로 가열한다. 상기 가열한 마쇄 대두를 여과하여 콩국을 얻고, 상기 콩국을 70 내지 75 °C에서 교반하면서 간수 또는 CaCl_2 등을 이용하여 응고하여 두부를 얻는다. 본 발명에서는 상기 공정 중에서 콩국을 70 내지 75 °C에서 응고하는 공정 후 가열된 마쇄 대두를 냉각시키고 간수 또는 CaCl_2 를 사용하지 않고 발효된 유산균 배양액을 상기 냉각
25 된 마쇄 대두에 첨가하여 응고시킴으로써 유산균이 포함된 두부를 제조할 수 있다.

또한, 상기 유산균 배양액은 가열한 대두를 여과하여 발생하는 찌꺼기인 콩비지를 이용하여 제조할 수 있다.

즉, 콩국의 생산 후에 발생하는 고형성분(콩비지)이 그대로 부쉬진

공인 상태이므로 미생물 효소를 이용하여 더욱 분해할 수 있으므로, 유산균 생산에 있어 좋은 질소 및 탄소원으로 활용할 수 있으므로 값비싼 유산균 생산용 배지가격을 낮출 수 있어 본 발명에서는 이를 이용하여 유산균이 발효된 유산균 배양액을 제조하고 그 유산균 배양액을 이용하여 두부 5 부를 제조하는 방법을 제공한다.

또한, 본 발명은 상기 유산균 배양액을 이용하여 두부를 제조한 후 남은 콩국에 시럽 또는 과일즙을 혼합함으로써 제조되는 유산균이 함유된 유산균 음료를 제조하는 방법을 제공한다.

그리고, 상기의 방법으로 제조된 유산균 음료를 제공한다.

10 상기 두부를 만든 후 남은 콩국에는 아미노산, 비타민, 섬유소 등 여러 가지 유기물을 비롯하여 무기 염류와 중요한 유산균이 들어있다. 따라서, 이러한 콩국에 시럽 또는 과일즙 등과 같은 적절한 향이 함유된 첨가물을 첨가하여 제조함으로써 유산균 음료를 제공할 수 있다.

따라서, 본 발명의 일실시예에 따라 도시된 도 1에서 보는 바와 같이 대두를 이용하여 콩국을 제조하고 식힌 후 제조된 유산균 배양액을 15 투입하여 유산균 두부를 제조할 수 있으며, 또한 콩국을 제조한 후 남은 콩비지를 이용하여 유산균 배양액을 제조하여 그 유산균 배양액을 식은 콩국에 투입하여 유산균이 함유된 두부를 제조할 수 있다. 그리고, 상기 와 같이 두부를 제조하고 남은 콩국에 시럽 또는 과일즙과 같은 첨가물을 20 첨가함으로써 유산균이 함유된 음료를 제조할 수 있다.

또한, 본 발명은

- a) 대두를 물에 불리는 공정;
- b) 상기 a)의 대두를 마쇄하는 공정;
- c) 소포제를 사용하여 상기 b)의 마쇄된 대두를 가열하는 공정;
- 25 d) 상기 c)의 가열한 마쇄 대두를 여과하여 콩국을 제조하는 공정;

및

- e) 상기 d)의 콩국을 식힌 후 유기산을 첨가하는 공정을 포함하는 두부의 제조 방법을 제공한다.

상기 기술한 바와 같이, 본 발명은 유산균을 배양한 액을 첨가하여

두부를 제조할 수 있고, 또한 유기산을 직접 두부 제조에 첨가하여도 두부를 제조할 수 있다.

상기 유기산으로는 바람직하게는 유산 또는 초산을 사용하는 것이 바람직하다.

5 또한, 상기 콩국을 식히는 온도는 40 °C 이하인 것이 바람직하다.

도면의 간단한 설명

도 1은 본 발명의 일 실시예에 따른 유산균 두부와 유산균 음료의 제조 공정도이다.

10

발명에 대한 상세한 설명

이하, 본 발명의 이해를 돕기 위하여 바람직한 실시예 및 제조예를 제시한다. 그러나, 하기의 실시예 및 제조예는 본 발명을 더욱 잘 이해 되도록 하기 위하여 제시되는 것일 뿐 본 발명이 하기의 실시예 및 제조예에 한정되는 것은 아니다.

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실시예 1 내지 7

360 mL 들이 병에 배추, 마늘, 배, 풋고추, 파인애플, 감자, 무를 각각 50, 60, 100, 40, 65, 105 및 75 g을 달아 넣었다. 여기에, 소금 100 g과 설탕 40 g을 넣어 물을 채워 4 L로 하여 소금 설탕 혼합액을 첨가하였다. 이 혼합액을 상기의 360 mL 병에 각각 330, 337, 301, 347, 337, 290, 284 mL를 넣어 주었다.

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그리고, 3일을 실온에서 방치하였다.

상기 실시예 1 내지 7에서 제조된 배양액의 pH를 측정한 결과 3.5이었다.

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비교예 1

실시예 1에서 배추 등을 제외하고 소금, 설탕 혼합물만을 사용하였다.

상기 비교예 1에서 제조된 용액의 pH는 6.0이었다.

제조예 1 내지 7

상기 실시예 1 내지 7에서 제조된 배양액 2 mL를 시판하고 있는
두유(삼육두유 제조) 3 mL에 넣어 두부를 제조하였다.

제조예 8

식초(상품명 2배 사과 식초, 오뚜기 식품 제조) 2 mL를 시판하고
5 있는 두유 3 mL에 넣어 두부를 제조하였다.

비교 제조예 1

비교예 1에서 배양한 액을 2 mL를 시판하고 있는 두유 3 mL에 넣
어 두부를 제조하였다.

비교 제조예 2

10 상기 제조예 1에서 배양액을 사용하지 않고 두유만을 사용하였다.
그 결과를 표 1에 나타내었다.

【표 1】

	응고여부
제 조 예 1	O
제 조 예 2	O
제 조 예 3	O
제 조 예 4	O
제 조 예 5	O
제 조 예 6	O
제 조 예 7	O
제 조 예 8	O
비 교 제 조 예 1	X
비 교 제 조 예 2	X

표 1에서 알 수 있는 바와 같이, 본 발명에 따라 제조된 제조예 1
15 내지 7의 경우에는 상기 배양액을 넣자마자 두유가 응고하여 두부가 제조
되는 것을 알 수 있으나 배양액을 넣지 않은 비교 제조예 1 및 2의 경우
에는 두유가 응고하지 않았음을 알 수 있었다. 특히, 제조예 중 무를 사
용한 경우 다른 제조예에 의한 것보다 훨씬 빨리 두유가 응고하여 두부가

되었음을 알 수 있었다. 또한, 식초와 같은 유기산을 직접 두부 제조 시에 첨가하여도 두유가 응고하는 현상이 나타나므로 유기산을 사용하여도 두부를 제조할 수 있음을 알 수 있었다.

본 발명은 두부를 제조하는 방법에서 발효된 유산균 배양액을 사용하여 융합으로써 종래의 두부 제조법을 과학화, 표준화하며, 유산균을 함유한 두부 및 음료를 만들어 자연스러운 유산균의 섭취를 유도하여 국민의 건강 증진과 두부의 보관성을 높일 수 있다.

또한, 두부 제조시 발생하는 부산물인 콩비지 및 남은 콩국을 이용하여 유산균 배양액을 발효시켜 두부 제조 공정에서 투입하여 유산균이 함유된 두부를 제조하거나 유산균이 함유된 음료를 제조함으로써 두부 및 유산균 음료의 제조 비용을 낮출 수 있고 또한 유산균이 풍부한 두부 및 음료를 국민에게 제공할 수 있으므로 국민 건강 증진에 일조를 할 수 있다.

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특허청구범위

【청구항 1】

유산균 배양액을 첨가하여 두부를 제조하는 방법으로서,

- a) 대두를 물에 불리는 공정;
- 5 b) 상기 a)의 대두를 마쇄하는 공정;
- c) 소포제를 사용하여 상기 b)의 마쇄된 대두를 가열하는 공정;
- d) 상기 c)의 가열한 마쇄 대두를 여과하여 콩국을 제조하는 공정;

및

- e) 상기 d)의 콩국을 식힌 후 유산균 배양액을 첨가하는 공정
- 10 을 포함하는 것을 특징으로 하는 두부의 제조 방법.

【청구항 2】

제 1항에 있어서,

상기 e)의 유산균 배양액의 유산균이 김치류에 존재하는 유산균인
두부의 제조 방법.

15 【청구항 3】

제 1항에 있어서,

상기 e)의 유산균 배양액이 소금, 설탕, 물, 및 채소류, 과일류 및
버섯류로 이루어진 군에서 선택되는 1 종 이상의 물질을 혼합하여 발효되
어 제조된 것인 두부의 제조 방법.

20 【청구항 4】

제 3항에 있어서,

상기 유산균 배양액이 콩비지를 더욱 포함하는 것인 두부의 제조
방법.

【청구항 5】

25 제 1항 또는 제 3항의 어느 한 항에 있어서,

상기 e)의 유산균 배양액이 김치류 국물인 두부의 제조 방법.

【청구항 6】

제 1항에 있어서,

상기 e)의 유산균 배양액이 소금, 설탕, 물 및 콩비지를 발효하여

제조된 것인 두부의 제조 방법.

【청구항 7】

제 3항 또는 제 4항의 어느 한 항에 있어서,

상기 채소류 및 과일류가 모든 채소류 및 과일류를 포함하는 것인

5 두부의 제조 방법.

【청구항 8】

제 1항의 제조 방법에 의하여 제조된 것을 특징으로 하는 두부.

【청구항 9】

제 1항에서 상기 두부를 제조한 후 남은 콩국에 시럽 또는 과일즙

10 을 혼합함으로써 제조되는 유산균이 함유된 것을 특징으로 하는 유산균
음료.

【청구항 10】

제 1항에서 상기 두부를 제조한 후 남은 콩국에 시럽 또는 과일즙

을 혼합함으로써 제조되는 것을 특징으로 하는 유산균 음료의 제조 방법.

15 【청구항 11】

a) 대두를 물에 불리는 공정;

b) 상기 a)의 대두를 마쇄하는 공정;

c) 소포제를 사용하여 상기 b)의 마쇄된 대두를 가열하는 공정;

d) 상기 c)의 가열한 마쇄 대두를 여과하여 콩국을 제조하는 공정;

20 및

e) 상기 d)의 콩국을 식힌 후 유기산을 첨가하는 공정

을 포함하는 것을 특징으로 하는 두부의 제조 방법.

【청구항 12】

제 11항에 있어서,

25 상기 유기산이 유산 또는 초산인 두부의 제조 방법.

【청구항 13】

제 1항 또는 제 11항의 어느 한 항에 있어서,

상기 e) 공정에서 상기 콩국을 40 ℃ 이하로 식히는 공정인 두부
의 제조 방법.

ABSTRACT

The present invention relates to a method for preparing bean curd using lactic acid fermenting bacteria culture fluid and lactic acid beverage and methods for preparing the same. Specifically, the present invention

5 provides a method for preparing bean curd containing lactic acid by preparing bean soup using soybeans, cooling the bean soup and adding lactic acid fermenting bacteria culture fluid to the bean soup and the bean curd prepared according to the method, and a method for preparing lactic acid beverage by adding syrup or fruit juice to the bean soup remaining after

10 preparing the bean curd and the lactic acid beverage prepared according to the method.